Page 1 of 7



1600

RAW SEQUENCE LISTING DATE: 07/30/2002 PATENT APPLICATION: US/09/044,696B TIME: 15:11:26

Input Set : A:\seqlist.txt

Output Set: N:\CRF3\07302002\I044696B.raw

ENTERED 3 <110> APPLICANT: BARCHFELD, Gail DEL GIUDICE, Giuseppe 5 RAPPUOLI, Rino <120> TITLE OF INVENTION: DETOXIFIED MUTANTS OF BACTERIAL ADP-RIBOSYLATING TOXINS AS PARENTERAL ADJUVANTS 10 <130> FILE REFERENCE: 2302-1393 / PP01393.002 12 <140> CURRENT APPLICATION NUMBER: 09/044,696B RECEIVED 13 <141> CURRENT FILING DATE: 1998-03-18 15 <160> NUMBER OF SEQ ID NOS: 5 17 <170> SOFTWARE: PatentIn Ver. 2.0 AUG 0 6 2002 19 <210> SEQ ID NO: 1 20 <211> LENGTH: 711 21 <212> TYPE: DNA TECH CENTER 1600/2900 22 <213> ORGANISM: Artificial Sequence 24 <220> FEATURE: 25 <221> NAME/KEY: CDS 26 <222> LOCATION: (1)..(708) 28 <220> FEATURE: 29 <223> OTHER INFORMATION: Description of Artificial Sequence: wild-type Subunit A from E. coli heat labile toxin 32 <400> SEQUENCE: 1 48 33 aat ggc gac aga tta tac cgt gct gac tct aga ccc cca gat gaa ata 34 Asn Gly Asp Arg Leu Tyr Arg Ala Asp Ser Arg Pro Pro Asp Glu Ile 5 10 35 96 37 aaa cgt ttc cgg agt ctt atg ccc aga ggt aat gag tac ttc gat aga 38 Lys Arg Phe Arg Ser Leu Met Pro Arg Gly Asn Glu Tyr Phe Asp Arg 25 41 gga act caa atg aat att aat ctt tat gat cac gcg aga gga aca caa 42 Gly Thr Gln Met Asn Ile Asn Leu Tyr Asp His Ala Arg Gly Thr Gln 43 35 40 45 acc ggc ttt gtc aga tat gat gac gga tat gtt tcc act tct ctt agt 192 46 Thr Gly Phe Val Arg Tyr Asp Asp Gly Tyr Val Ser Thr Ser Leu Ser 60 55 49 ttg aga agt gct cac tta gca gga cag tat ata tta tca gga tat tca 240 50 Leu Arg Ser Ala His Leu Ala Gly Gln Tyr Ile Leu Ser Gly Tyr Ser 75 70 53 ctt act ata tat atc gtt ata gca aat atg ttt aat gtt aat gat gta 288 54 Leu Thr Ile Tyr Ile Val Ile Ala Asn Met Phe Asn Val Asn Asp Val

90

57 att age gta tae age eet cae eea tat gaa eag gag gtt tet geg tta 58 Ile Ser Val Tyr Ser Pro His Pro Tyr Glu Gln Glu Val Ser Ala Leu

61 ggt gga ata cca tat tct cag ata tat gga tgg tat cgt gtt aat ttt

105

336

384

85

55

Input Set : A:\seqlist.txt

Output Set: N:\CRF3\07302002\I044696B.raw

```
62 Gly Gly Ile Pro Tyr Ser Gln Ile Tyr Gly Trp Tyr Arg Val Asn Phe
           115
                               120
65 qgt gtg att gat gaa cga tta cat cgt aac agg gaa tat aga gac cgg
                                                                      432
66 Gly Val Ile Asp Glu Arg Leu His Arg Asn Arg Glu Tyr Arg Asp Arg
                           135
                                                140
                                                                      480
69 tat tac aga aat ctg aat ata gct ccg gca gag gat ggt tac aga tta
70 Tyr Tyr Arg Asn Leu Asn Ile Ala Pro Ala Glu Asp Gly Tyr Arg Leu
                       150
                                           155
73 gca ggt ttc cca ccg gat cac caa gct tgg aga gaa gaa ccc tgg att
                                                                      528
74 Ala Gly Phe Pro Pro Asp His Gln Ala Trp Arg Glu Glu Pro Trp Ile
                                        170
75
                   165
                                                                      576
77 cat cat qca cca caa qqt tqt qqa qat tca tca aga aca atc aca ggt
78 His His Ala Pro Gln Gly Cys Gly Asp Ser Ser Arg Thr Ile Thr Gly
               180
                                   185
81 gat act tgt aat gag gag acc cag aat ctg agc aca ata tat ctc agg
                                                                      624
82 Asp Thr Cys Asn Glu Glu Thr Gln Asn Leu Ser Thr Ile Tyr Leu Arg
           195
                               200
85 gaa tat caa tca aaa gtt aag agg cag ata ttt tca gac tat cag tca
                                                                      672
86 Glu Tyr Gln Ser Lys Val Lys Arg Gln Ile Phe Ser Asp Tyr Gln Ser
       210
                           215
89 gag gtt gac ata tat aac aga att cgg gat gaa tta tga
                                                                      711
90 Glu Val Asp Ile Tyr Asn Arg Ile Arg Asp Glu Leu
                       230
94 <210> SEQ ID NO: 2
95 <211> LENGTH: 236
96 <212> TYPE: PRT
97 <213> ORGANISM: Artificial Sequence
99 <220> FEATURE:
100 <223> OTHER INFORMATION: Description of Artificial Sequence: wild-type Subunit
          A from E. coli heat labile toxin
103 <400> SEQUENCE: 2
104 Asn Gly Asp Arg Leu Tyr Arg Ala Asp Ser Arg Pro Pro Asp Glu Ile
                                         10
107 Lys Arg Phe Arg Ser Leu Met Pro Arg Gly Asn Glu Tyr Phe Asp Arg
                                     25
                 20
110 Gly Thr Gln Met Asn Ile Asn Leu Tyr Asp His Ala Arg Gly Thr Gln
             35
                                 40
113 Thr Gly Phe Val Arg Tyr Asp Asp Gly Tyr Val Ser Thr Ser Leu Ser
                             55
         50
116 Leu Arg Ser Ala His Leu Ala Gly Gln Tyr Ile Leu Ser Gly Tyr Ser
                                             75
119 Leu Thr Ile Tyr Ile Val Ile Ala Asn Met Phe Asn Val Asn Asp Val
120
                                         90
                     85
122 Ile Ser Val Tyr Ser Pro His Pro Tyr Glu Glu Val Ser Ala Leu
                100
                                    105
125 Gly Gly Ile Pro Tyr Ser Gln Ile Tyr Gly Trp Tyr Arg Val Asn Phe
                                120
                                                     125
            115
128 Gly Val Ile Asp Glu Arg Leu His Arg Asn Arg Glu Tyr Arg Asp Arg
                            135
```

Input Set : A:\seqlist.txt

Output Set: N:\CRF3\07302002\1044696B.raw

		Tyr	Arg	Asn	Leu		Ile	Ala	Pro	Ala		Asp	Gly	Tyr	Arg		
	145					150					155			_	_	160	
	Ala	Gly	Phe	Pro		Asp	His	Gln	Ala		Arg	GIu	GLu	Pro		iie	
135	•			_	165	- 1		<b>a</b> 1		170	<b>a</b>	3	m)	<b>~</b> 1_	175	01	
	His	His	Ala		GIn	GTĀ	Cys	GTÄ	Asp	Ser	ser	Arg	Thr		Tnr	GTĀ	
138	•	m1		180	<b>01</b>	<b>a</b> 1	mh	G1 =	185	T 0	Com	Πh∽	т1.	190	T 011	7 × a	
	Asp	Thr	_	Asn	GIU	GIU	Thr		Asn	Leu	ser	THE		тут	ьeu	AIG	
141	<b>01</b>	m	195	<b>a</b>	T	170 1	T	200	<b>71</b> 5	т1.	Dha	Com	205	Пих	Cln	Cor	
	GIU	_	GIN	ser	Lys	vaı	цуS 215	Arg	Gln	тте	Pne	220	ASP	TYL	GTII	Ser	
144	C1	210	N an	т1а	Фттх	A cn		т1 о	Arg	λan	Clu					,	
	225	Val	ASP	TIE	тАт	230	ALG	116	AIG	usb	235	пец					
	<210	)	P∩ TI	OM C	. 2	230					233						
	<21																
	<21				2.5												
					Δrt.	ific	ial 9	Seque	ence								
	<220				111 0.			Joqui	-1100								
	<22				CDS								•				
	<22		•			(7:	201										
	<220				(-/		,										
					ORMA!	rion	: Des	scrip	otio	n of	Art:	ific	ial :	Seque	ence	: wild	type CT
161			ıbun:					•	•					-			
	<400				3												
						tat	cgg	gca	gat	tct	aga	cct	cct	gat	gaa	ata	48
165	Asn	Asp	Asp	Lys	Leu	Tyr	Arg	Ala	Asp	Ser	Arg	Pro	Pro	Asp	Glu	Ile	
166	1	-	_	_	5	_				10					15		
168	aag	cag	tca	ggt	ggt	ctt	atg	cca	aga	gga	cag	agt	gag	tac	ttt	gac	96
169	Lys	Gln	Ser	Gly	Gly	Leu	Met	Pro	Arg	Gly	Gln	Ser	Glu	Tyr	Phe	Asp	
170				20					25					30			
									ctt								144
173	Arg	Gly	Thr	Gln	Met	Asn	Ile	Asn	Leu	Tyr	Asp	His		Arg	Gly	Thr	
174			35					40					45				
									gat								192
	Gln		Gly	Phe	Val	Arg		Asp	Asp	Gly	Tyr		Ser	Thr	Ser	Ile	
178		50					55					60					0.40
									ggt								240
		Leu	Arg	Ser	Ala		Leu	vaı	Gly	GIn		шe	ьeu	ser	GIY		
182	65					70					75					80	200
184	tct	act	tat	tat	ata	tat	gtt	ata	gcc	act	gca	CCC	aac	atg	Dha	aac	288
	ser	Thr	Tyr	Tyr		Tyr	vaı	тте	Ala		Ala	PIO	ASII	мес	95	ASII	
186					85					90	+		~ n +	~~~		<i>α</i>	336
									agt								330
	vaı	ASII	Asp		ьeu	СТУ	Ата	TAT	Ser	PIO	птъ	PIO	ASP	110	GIII	Giu	
190	a++	+ <+	ac+	100	aa+	aaa	a++	CCS	105 tac	tee	caa	ata	tat		taa	tat	384
									Tyr								J .
193	val	SET	115	neu	GTĀ	дтў	116	120	- Y -	JUL	0.111	116	125	- T	1	-1-	
	cas	at+		+++	aaa	ata	ctt		gaa	caa	tta	cat		aat	аσσ	aac	432
									Glu								
191	9	1 U I	1113	1 110		+ W T							3		3	1	

Input Set : A:\seqlist.txt

Output Set: N:\CRF3\07302002\1044696B.raw

198		130					135					140					
	tac		σat	апа	tat	tac		aac	tta	σat	att		cca	αca	αca	gat	480
						Tyr											
	145	*****	op		-1-	150					155					160	
		tat	σσα	t.t.a	gca	ggt	ttc	cct.	cca	σασ		aσa	act	taa	agg	gaa	528
205	Glv	Tvr	Glv	Leu	Ala	Gly	Phe	Pro	Pro	Glu	His	Arg	Ala	Trp	Arq	Glu	
206	011	-1-		204	165	0-1				170		5			175		
	σασ	cca	t.aa	att		cat	qca	cca	cca	gat	tat	aaa	aat	qct	cca	aga	576
						His											
210				180					185	•	-	. •		190			
	tca	tcq	atc	aqt	aat	act	tgc	gat	qaa	aaa	acc	caa	agt	cta	ggt	gta	624
						Thr											
214			195				-	200		-			205		_		
216	aaa	ttc	ctt	gac	gaa	tac	caa	tct	aaa	gtt	aaa	aga	caa	ata	ttt	tca	672
						Tyr											
218	-	210		_		_	215		_			220					
220	ggc	tat	caa	tct	gat	att	gat	aca	cat	aat	aga	att	aag	gat	gaa	tta	720
221	Gly	Tyr	Gln	Ser	Asp	Ile	Asp	Thr	His	Asn	Arg	Ile	Lys	Asp	Glu	Leu	
222	225					230					235					240	
224	tga																723
227	<210	)> SI	EQ II	ON C	: 4												
228	<211	l> L	ENGTI	I: 24	10												
229	<212	2> T	YPE:	PRT													
0 2 0	/213	3 N	ר זא גד יסכ	CM.	Art -	ifiai	ial 🤇	Seame	ence								
					AIC.	LTTC.	Lar	Jeque									
232	<220	)> FI	EATUI	RE:			,	_									
232	<220	)> FI 3> O	EATUI CHER	RE:			,	_		n of	Art	lfici	ial s	Seque	ence	wild:	type CT
232 233 234	<220 <223	0> F1 3> 0' su	EATUI THER 1buni	RE: INF( Lt A	ORMA'		,	_		n of	Arti	Lfici	ial s	Seque	ence	: wild	type CT
232 233 234 236	<220 <223 <400	0> F1 3> 0' su 0> S1	EATUI THER ibuni EQUEI	RE: INF( Lt A NCE:	ORMA:	TION	: Des	scrip	ptio								-type CT
232 233 234 236 237	<220 <223 <400 Asn	0> F1 3> 0' su 0> S1	EATUI THER ibuni EQUEI	RE: INF( Lt A NCE:	ORMA 4 Leu		: Des	scrip	ptio	Ser					Glu		-type CT
232 233 234 236 237 238	<220 <223 <400 Asn 1	)> F1 3> 0' st )> S1 Asp	EATUI THER Lbuni EQUEI Asp	RE: INF( it A NCE: Lys	ORMA? 4 Leu 5	Tyr	: Des	scri <sub>l</sub>	Asp	Ser 10	Arg	Pro	Pro	Asp	Glu 15	Ile	-type CT
232 233 234 236 237 238 240	<220 <223 <400 Asn 1	)> F1 3> 0' st )> S1 Asp	EATUI THER Lbuni EQUEI Asp	RE: INFO Lt A NCE: Lys Gly	ORMA? 4 Leu 5	TION	: Des	scri <sub>l</sub>	Asp Arg	Ser 10	Arg	Pro	Pro	Asp Tyr	Glu 15	Ile	-type CT
232 233 234 236 237 238 240 241	<220 <223 <400 Asn 1 Lys	O> FI B> OT SI O> SI Asp Gln	EATUI THER ubuni EQUEN Asp	RE: INFO Lt A NCE: Lys Gly 20	ORMA 4 Leu 5 Gly	TYT Leu	Des Arg Met	acrig Ala Pro	Asp Arg 25	Ser 10 Gly	Arg Gln	Pro Ser	Pro Glu	Asp Tyr 30	Glu 15 Phe	Ile Asp	-type CT
232 233 234 236 237 238 240 241 243	<220 <223 <400 Asn 1 Lys	O> FI B> OT SI O> SI Asp Gln	EATUI THER ibuni EQUEN Asp Ser	RE: INFO Lt A NCE: Lys Gly 20	ORMA 4 Leu 5 Gly	Tyr	Des Arg Met	Ala Pro Asn	Asp Arg 25	Ser 10 Gly	Arg Gln	Pro Ser	Pro Glu Ala	Asp Tyr 30	Glu 15 Phe	Ile Asp	-type CT
232 233 234 236 237 238 240 241 243 244	<220 <223 <400 Asn 1 Lys	O> FI B> OT st O> SI Asp Gln Gly	EATUI THER ibuni EQUEN Asp Ser Thr 35	RE: INFO it A NCE: Lys Gly 20 Gln	A Leu 5 Gly Met	Tyr Leu Asn	E Des	Ala Pro Asn 40	Asp Arg 25 Leu	Ser 10 Gly Tyr	Arg Gln Asp	Pro Ser His	Pro Glu Ala 45	Asp Tyr 30 Arg	Glu 15 Phe Gly	Ile Asp Thr	-type CT
232 233 234 236 237 238 240 241 243 244 246	<220 <223 <400 Asn 1 Lys	O> FI 3> OT     SI O> SI Asp Gln Gly Thr	EATUI THER ibuni EQUEN Asp Ser Thr 35	RE: INFO it A NCE: Lys Gly 20 Gln	A Leu 5 Gly Met	TYT Leu	Arg Met Ile	Ala Pro Asn 40	Asp Arg 25 Leu	Ser 10 Gly Tyr	Arg Gln Asp	Pro Ser His Val	Pro Glu Ala 45	Asp Tyr 30 Arg	Glu 15 Phe Gly	Ile Asp Thr	-type CT
232 233 234 236 237 238 240 241 243 244 246 247	<220 <223 <400 Asn 1 Lys Arg	O> FI 3> OO SI O> SI Asp Gln Gly Thr 50	EATUI THER Ibuni EQUEN Asp Ser Thr 35 Gly	RE: INFO it A NCE: Lys Gly 20 Gln Phe	A Leu 5 Gly Met Val	Tyr Leu Asn Arg	Arg Met Ile His 55	Ala Pro Asn 40 Asp	Asp Arg 25 Leu Asp	Ser 10 Gly Tyr	Arg Gln Asp Tyr	Pro Ser His Val 60	Pro Glu Ala 45 Ser	Asp Tyr 30 Arg	Glu 15 Phe Gly Ser	Ile Asp Thr Ile	-type CT
232 233 234 236 237 238 240 241 243 244 246 247 249	<220 <223 <400 Asn 1 Lys Arg Gln Ser	O> FI 3> OO SI O> SI Asp Gln Gly Thr 50	EATUI THER Ibuni EQUEN Asp Ser Thr 35 Gly	RE: INFO it A NCE: Lys Gly 20 Gln Phe	A Leu 5 Gly Met Val	Tyr Leu Asn Arg	Arg Met Ile His 55	Ala Pro Asn 40 Asp	Asp Arg 25 Leu Asp	Ser 10 Gly Tyr	Arg Gln Asp Tyr	Pro Ser His Val 60	Pro Glu Ala 45 Ser	Asp Tyr 30 Arg	Glu 15 Phe Gly Ser	Ile Asp Thr Ile	-type CT
232 233 234 236 237 238 240 241 243 244 246 247 249 250	<220 <223 <400 Asn 1 Lys Arg Gln Ser 65	O> FI 3> OT SI O> SI Asp Gln Gly Thr 50 Leu	EATURENT SERVICE ASP  Ser  Thr  35  Gly  Arg	RE: INF( it A NCE: Lys Gly 20 Gln Phe Ser	A Leu 5 Gly Met Val	Tyr Leu Asn Arg His	Arg Met Ile His 55	Ala Pro Asn 40 Asp	Asp Arg 25 Leu Asp	Ser 10 Gly Tyr Gly	Arg Gln Asp Tyr Thr 75	Pro Ser His Val 60	Pro Glu Ala 45 Ser Leu	Asp Tyr 30 Arg Thr	Glu 15 Phe Gly Ser Gly	Ile Asp Thr Ile His	-type CT
232 233 234 236 237 238 240 241 243 244 246 247 249 250 252	<220 <223 <400 Asn 1 Lys Arg Gln Ser 65	O> FI 3> OT SI O> SI Asp Gln Gly Thr 50 Leu	EATURE THER LIBURGE ASP Ser Thr 35 Gly Arg	RE: INF( it A NCE: Lys Gly 20 Gln Phe Ser	Ala	Tyr Leu Asn Arg His 70 Tyr	Arg Met Ile His 55 Leu Val	Ala Pro Asn 40 Asp Val	Asp Arg 25 Leu Asp Gly	Ser 10 Gly Tyr Gly Gln	Arg Gln Asp Tyr Thr 75 Ala	Pro Ser His Val 60 Ile	Pro Glu Ala 45 Ser Leu Asn	Asp Tyr 30 Arg Thr Ser	Glu 15 Phe Gly Ser Gly Phe	Ile Asp Thr Ile His 80 Asn	-type CT
232 233 234 236 237 238 240 241 243 244 246 247 249 250 252 253	<220 <223 <400 Asn 1 Lys Arg Gln Ser 65 Ser	O> FI B> OT SI O> SI Asp Gln Gly Thr 50 Leu	EATURE THER LIBURE ASP SET Thr 35 Gly Arg	RE: INFO it A NCE: Lys Gly 20 Gln Phe Ser	Ala Ile 85	Tyr Leu Asn Arg His 70	Arg Met Ile His 55 Leu Val	Ala Pro Asn 40 Asp Val	Asp Arg 25 Leu Asp Gly	Ser 10 Gly Tyr Gly Gln Thr	Arg Gln Asp Tyr Thr 75 Ala	Pro Ser His Val 60 Ile	Pro Glu Ala 45 Ser Leu Asn	Asp Tyr 30 Arg Thr Ser	Glu 15 Phe Gly Ser Gly Phe 95	Ile Asp Thr Ile His 80 Asn	-type CT
232 233 234 236 237 238 240 241 243 244 246 247 249 250 252 253 255	<220 <223 <400 Asn 1 Lys Arg Gln Ser 65 Ser	O> FI B> OT SI O> SI Asp Gln Gly Thr 50 Leu	EATURE THER LIBURE ASP SET Thr 35 Gly Arg	RE: INF( it A NCE: Lys Gly 20 Gln Phe Ser Tyr	Ala Ile 85	Tyr Leu Asn Arg His 70 Tyr	Arg Met Ile His 55 Leu Val	Ala Pro Asn 40 Asp Val	Asp Arg 25 Leu Asp Gly Ala Ser	Ser 10 Gly Tyr Gly Gln Thr	Arg Gln Asp Tyr Thr 75 Ala	Pro Ser His Val 60 Ile	Pro Glu Ala 45 Ser Leu Asn	Asp Tyr 30 Arg Thr Ser Met Glu	Glu 15 Phe Gly Ser Gly Phe 95	Ile Asp Thr Ile His 80 Asn	type CT
232 233 234 236 237 238 240 241 243 244 246 247 249 250 252 253 255 256	<220 <223 <400 Asn 1 Lys Arg Gln Ser 65 Ser Val	O> FI B> OT SI O> SI Asp Gln Gly Thr 50 Leu Thr Asn	EATURE THER LIBURE ASP SET Thr 35 Gly Arg Tyr Asp	RE: INFO it A NCE: Lys Gly 20 Gln Phe Ser Tyr Val 100	Ala Ile 85 Leu	Tyr Leu Asn Arg His 70 Tyr	Arg Met Ile His 55 Leu Val	Ala Pro Asn 40 Asp Val Ile	Asp Arg 25 Leu Asp Gly Ala Ser 105	Ser 10 Gly Tyr Gly Gln Thr 90 Pro	Arg Gln Asp Tyr Thr 75 Ala	Pro Ser His Val 60 Ile Pro	Pro Glu Ala 45 Ser Leu Asn	Asp Tyr 30 Arg Thr Ser Met Glu 110	Glu 15 Phe Gly Ser Gly Phe 95 Gln	Ile Asp Thr Ile His 80 Asn Glu	-type CT
232 233 234 236 237 238 240 241 243 244 246 247 249 250 252 253 255 256 258	<220 <223 <400 Asn 1 Lys Arg Gln Ser 65 Ser Val	O> FI B> OT SI O> SI Asp Gln Gly Thr 50 Leu Thr Asn	EATURE THER IDUNTS EQUENT ASP SET Thr 35 Gly Arg Tyr Asp Ala	RE: INFO it A NCE: Lys Gly 20 Gln Phe Ser Tyr Val 100	Ala Ile 85 Leu	Tyr Leu Asn Arg His 70	Arg Met Ile His 55 Leu Val	Ala Pro Asn 40 Asp Val Ile Tyr Pro	Asp Arg 25 Leu Asp Gly Ala Ser 105	Ser 10 Gly Tyr Gly Gln Thr 90 Pro	Arg Gln Asp Tyr Thr 75 Ala	Pro Ser His Val 60 Ile Pro	Pro Glu Ala 45 Ser Leu Asn Asp	Asp Tyr 30 Arg Thr Ser Met Glu 110	Glu 15 Phe Gly Ser Gly Phe 95 Gln	Ile Asp Thr Ile His 80 Asn Glu	-type CT
232 233 234 236 237 238 240 241 243 244 246 247 249 250 252 253 255 256 258 259	<220 <223 <400 Asn 1 Lys Arg Gln Ser 65 Ser Val	O> FI 3> OT	EATURE THER IDUNTS EQUENT ASP SET Thr 35 Gly Arg Tyr Asp Ala 115	RE: INFO it A NCE: Lys Gly 20 Gln Phe Ser Tyr Val 100 Leu	Ala Ile 85 Leu Gly	Tyr Leu Asn Arg His 70 Tyr Gly	Arg Met Ile His 55 Leu Val Ala Ile	Ala Pro Asn 40 Asp Val Ile Tyr Pro 120	Asp Arg 25 Leu Asp Gly Ala Ser 105	Ser 10 Gly Tyr Gly Gln Thr 90 Pro	Arg Gln Asp Tyr Thr 75 Ala His	Pro Ser His Val 60 Ile Pro Pro	Pro Glu Ala 45 Ser Leu Asn Asp Tyr 125	Asp Tyr 30 Arg Thr Ser Met Glu 110 Gly	Glu 15 Phe Gly Ser Gly Phe 95 Gln	Ile Asp Thr Ile His 80 Asn Glu Tyr	-type CT
232 233 234 236 237 238 240 241 243 244 246 247 250 252 253 255 256 258 259 261	<220 <223 <400 Asn 1 Lys Arg Gln Ser 65 Ser Val	O> FI 3> OT	EATURE THER IDUNTS EQUENT ASP SET Thr 35 Gly Arg Tyr Asp Ala 115	RE: INFO it A NCE: Lys Gly 20 Gln Phe Ser Tyr Val 100 Leu	Ala Ile 85 Leu Gly	Tyr Leu Asn Arg His 70 Tyr	Arg Met Ile His 55 Leu Val Ala Ile Leu	Ala Pro Asn 40 Asp Val Ile Tyr Pro 120	Asp Arg 25 Leu Asp Gly Ala Ser 105	Ser 10 Gly Tyr Gly Gln Thr 90 Pro	Arg Gln Asp Tyr Thr 75 Ala His	Pro Ser His Val 60 Ile Pro Pro Ile His	Pro Glu Ala 45 Ser Leu Asn Asp Tyr 125	Asp Tyr 30 Arg Thr Ser Met Glu 110 Gly	Glu 15 Phe Gly Ser Gly Phe 95 Gln	Ile Asp Thr Ile His 80 Asn Glu Tyr	-type CT
232 233 234 236 237 238 240 241 243 244 246 247 250 252 253 255 256 258 259 261 262	<220 <223 <400 Asn 1 Lys Arg Gln Ser 65 Ser Val Val Arg	O> FI 3> OT SI O> SI Asp Gln Gly Thr 50 Leu Thr Asn Ser Val	EATURE THER LIBURITY ASP Ala 115 His	RE: INFO it A NCE: Lys Gly 20 Gln Phe Ser Tyr Val 100 Leu Phe	Ala Ile 85 Leu Gly Gly	Tyr Leu Asn Arg His 70 Tyr Gly Gly Val	Arg Met Ile His 55 Leu Val Ala Ile Leu 135	Ala Pro Asn 40 Asp Val Ile Tyr Pro 120 Asp	Asp Asp 25 Leu Asp Gly Ala Ser 105 Tyr	Ser 10 Gly Tyr Gly Gln Thr 90 Pro Ser Gln	Arg Gln Asp Tyr Thr 75 Ala His Gln Leu	Pro Ser His Val 60 Ile Pro Pro Ile His 140	Pro Glu Ala 45 Ser Leu Asn Asp Tyr 125 Arg	Asp Tyr 30 Arg Thr Ser Met Glu 110 Gly Asn	Glu 15 Phe Gly Ser Gly Phe 95 Gln Trp	Ile Asp Thr Ile His 80 Asn Glu Tyr Gly	-type CT
232 233 234 236 237 238 240 241 243 244 246 247 249 250 252 253 255 256 258 259 261 262 264	<220 <223 <400 Asn 1 Lys Arg Gln Ser 65 Ser Val Val Arg	O> FI 3> OT SI O> SI Asp Gln Gly Thr 50 Leu Thr Asn Ser Val	EATURE THER ASP Ser Thr 35 Gly Arg Tyr Asp Ala 115 His	RE: INFO it A NCE: Lys Gly 20 Gln Phe Ser Tyr Val 100 Leu Phe	Ala Ile 85 Leu Gly Gly	Tyr Leu Asn Arg His 70 Tyr Gly	Arg Met Ile His 55 Leu Val Ala Ile Leu 135	Ala Pro Asn 40 Asp Val Ile Tyr Pro 120 Asp	Asp Asp 25 Leu Asp Gly Ala Ser 105 Tyr	Ser 10 Gly Tyr Gly Gln Thr 90 Pro Ser Gln	Arg Gln Asp Tyr Thr 75 Ala His Gln Leu	Pro Ser His Val 60 Ile Pro Pro Ile His 140	Pro Glu Ala 45 Ser Leu Asn Asp Tyr 125 Arg	Asp Tyr 30 Arg Thr Ser Met Glu 110 Gly Asn	Glu 15 Phe Gly Ser Gly Phe 95 Gln Trp	Ile Asp Thr Ile His 80 Asn Glu Tyr Gly	-type CT
232 233 234 236 237 238 240 241 243 244 246 247 250 252 253 255 256 258 259 261 262 264 265	<220 <223 <400 Asn 1 Lys Arg Gln Ser 65 Ser Val Val Arg Tyr 145	O> FI 3> OT	EATURE THER ASP Ser Thr 35 Gly Arg Tyr Asp Ala 115 His	RE: INFO it A NCE: Lys Gly 20 Gln Phe Ser Tyr Val 100 Leu Phe Arg	Ala Ile 85 Leu Gly Gly Tyr	Tyr Leu Asn Arg His 70 Tyr Gly Gly Val	Arg Met Ile His 55 Leu Val Ala Ile Leu 135 Ser	Ala Pro Asn 40 Asp Val Ile Tyr Pro 120 Asp	Asp Arg 25 Leu Asp Gly Ala Ser 105 Tyr Glu Leu	Ser 10 Gly Tyr Gly Gln Thr 90 Pro Ser Gln Asp	Arg Gln Asp Tyr Thr 75 Ala His Gln Leu Ile 155	Pro Ser His Val 60 Ile Pro Pro Ile His 140 Ala	Pro Glu Ala 45 Ser Leu Asn Asp Tyr 125 Arg	Asp Tyr 30 Arg Thr Ser Met Glu 110 Gly Asn Ala	Glu 15 Phe Gly Ser Gly Phe 95 Gln Trp Arg	Ile Asp Thr Ile His 80 Asn Glu Tyr Gly Asp 160	type CT

Input Set : A:\seqlist.txt

Output Set: N:\CRF3\07302002\I044696B.raw

```
165
                                        170
270 Glu Pro Trp Ile His His Ala Pro Pro Gly Cys Gly Asn Ala Pro Arg
                180
                                    185
273 Ser Ser Ile Ser Asn Thr Cys Asp Glu Lys Thr Gln Ser Leu Gly Val
          195
                                200
276 Lys Phe Leu Asp Glu Tyr Gln Ser Lys Val Lys Arg Gln Ile Phe Ser
                            215
                                                220
279 Gly Tyr Gln Ser Asp Ile Asp Thr His Asn Arg Ile Lys Asp Glu Leu
280 225
                        230
283 <210> SEQ ID NO: 5
284 <211> LENGTH: 240
285 <212> TYPE: PRT
286 <213> ORGANISM: Artificial Sequence
288 <220> FEATURE:
289 <223> OTHER INFORMATION: Description of Artificial Sequence: wild-type Subunit
         A from E. coli heat labile toxin
292 <400> SEQUENCE: 5
293 Asn Gly Asp Arg Leu Tyr Arg Ala Asp Ser Arg Pro Pro Asp Glu Ile
                                         10
296 Lys Arg Ser Gly Gly Leu Met Pro Arg Gly His Asn Glu Tyr Phe Asp
                 20
                                     25
299 Arg Gly Thr Gln Met Asn Ile Asn Leu Tyr Asp His Ala Arg Gly Thr
             35
302 Gln Thr Gly Phe Val Arg Tyr Asp Asp Gly Tyr Val Ser Thr Ser Leu
305 Ser Leu Arg Ser Ala His Leu Ala Gly Gln Ser Ile Leu Ser Gly Tyr
                                             75
                         70
308 Ser Thr Tyr Tyr Ile Tyr Val Ile Ala Thr Ala Pro Asn Met Phe Asn
                     85
311 Val Asn Asp Val Leu Gly Val Tyr Ser Pro His Pro Tyr Glu Gln Glu
                                                         110
312
                100
                                    105
314 Val Ser Ala Leu Gly Gly Ile Pro Tyr Ser Gln Ile Tyr Gly Trp Tyr
                                120
315
           115
317 Arg Val Asn Phe Gly Val Ile Asp Glu Arg Leu His Arg Asn Arg Glu
                            135
                                                140
320 Tyr Arg Asp Arg Tyr Tyr Arg Asn Leu Asn Ile Ala Pro Ala Glu Asp
                        150
                                            155
323 Gly Tyr Arg Leu Ala Gly Phe Pro Pro Asp His Gln Ala Trp Arg Glu
                                        170
326 Glu Pro Trp Ile His His Ala Pro Gln Gly Cys Gly Asn Ser Ser Arg
327
                180
                                    185
329 Thr Ile Thr Gly Asp Thr Cys Asn Glu Glu Thr Gln Asn Leu Ser Thr
                                200
332 Ile Tyr Leu Arg Glu Tyr Gln Ser Lys Val Lys Arg Gln Ile Phe Ser
                            215
                                                220
335 Asp Tyr Gln Ser Glu Val Asp Ile Tyr Asn Arg Ile Arg Asp Glu Leu
336 225
                        230
```

VERIFICATION SUMMARY

DATE: 07/30/2002

PATENT APPLICATION: US/09/044,696B

TIME: 15:11:27

Input Set : A:\seqlist.txt

Output Set: N:\CRF3\07302002\I044696B.raw